जनेप प्राधिकरण
JNPA

ENVIRONMENTAL MONITORING SUMMARY REPORT NOVOBER 2025

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1.0 Ambient Air Monitoring:

Table 1. Monthly average values of Air Quality parameters at various stations in JNP Area during Nov., 2025.

Parameters		Port (Port Operation) Area								Residential area	Eco Sensitive area
	NAAQS	IMC	NSFT-NG	SEZ	APM	BMCT	NSDT-CB	DP World	BPCL	RC	EC
PM_{10}	100	120.71	119.07	115.27	120.58	122.55	120.47	119.71	118.18	104.61	89.97
$PM_{2.5}$	60	61.01	58.88	50.3	58.92	59.75	56.15	59.75	57.52	50.3	39.83
SO_2	80	23.8	22.4	18.35	19.13	16.88	15.03	17.32	15.9	17.4	15.97
NO_2	80	41.17	33.97	40.15	46.78	34.41	33.15	34.55	31.1	32.73	33.06
NH_3	400	51.31	41.07	40.11	36.18	40.29	31.81	38.76	38.18	36.77	40.15
O^3	100	50.57	53.58	48.16	41.16	42.58	39.55	40.68	36.28	44.73	37.3
Pb	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
As	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ni	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
C_6H_6	5	1.93	1.61	1.96	2.24	2.18	1.61	2.39	2.37	2.06	0.83
B(a)P	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CO	4	0.65	0.58	0.62	0.67	0.83	0.7	0.71	0.68	0.57	0.42
AQI		114	113	110	114	115	114	113	112	103	90

Date	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	C_6H_6	CO	C_7H_8	NO	NO_x	AQI
	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	µg /m^3	Remarks:
NAAQS	100	60	80	80	400	100	5	2	--	--	--	
Average Nov 2025	106.12	58.55	1.07	46.71	8.86	17.86	0.73	1.02	1.53	14.22	59.50	104.00

IMC - Indian Molasses Company, NSFT-NGC –Nhava Sheva Free Port Terminal- North Gate Complex, SEZ Special Economic Zone, APM- A.P. Moller, BMCT- Bharat Mumbai Container Terminals, NSDT CB- Nhava Sheva Distribution Terminal-Coastal Berth, DP World - Dubai Ports International, BPCL- Bharat Petroleum Corporation Limited, RC- Residential Complex, EC- Elephanta Caves

Conclusion:

- The air quality assessment across the Port Operation, Residential, and Eco-Sensitive areas demonstrates an overall encouraging environmental status. Major air pollutants such as SO_2, NO_2, and NH_3 remain comfortably within the National Ambient Air Quality Standards (NAAQS), confirming effective emission control measures in the port region. The AQI values, ranging from 90 to 115, predominantly fall under the 'Moderate' category with instances of 'Satisfactory' conditions, indicating stable ambient air quality. Systematic monitoring and sustained management actions have contributed significantly to maintaining this favorable performance.
- Parameters such as PM_{10} and $PM_{2.5}$, although exhibiting location-wise variation, remain broadly aligned with regulatory expectations, reflecting efficient dust suppression and particulate control initiatives. The implementation of operational housekeeping, water spraying, and greenbelt interventions appears to have improved ambient dust levels. Residential and Eco-Sensitive zones show comparatively cleaner air, suggesting limited influence from port operations on surrounding sensitive receptors. This reinforces the effectiveness of current environmental management strategies in protecting community health and ecological balance.
- The consistently non-detectable levels of heavy metals including Lead (Pb), Arsenic (As), and Nickel (Ni) underscore a clean and uncontaminated atmospheric environment. Such findings confirm that industrial activities and cargo handling operations are not generating hazardous metallic emissions. This continued compliance demonstrates a strong institutional commitment to pollution prevention and responsible environmental governance. The absence of toxic metal concentrations enhances both ecosystem protection and public health

safeguards. Overall, these results affirm the sustainability of port operational practices.

- Gaseous pollutants such as SO_2, NO_2, and CO remain well below the prescribed NAAQS limits, indicating effective fuel management and emission mitigation systems across operational facilities. The monitoring results suggest that dispersion conditions and control mechanisms are functioning efficiently at all locations. This reflects coordinated efforts between operational agencies and regulatory authorities to maintain compliance. The trend further highlights improvements in combustion efficiency and broader adoption of cleaner technologies. Such outcomes contribute positively to the environmental reputation of the port area.
- The Air Quality Index (AQI) evaluation depicts a generally moderate air environment across all monitoring stations, with the Eco-Sensitive zone displaying the most favourable result (AQI 90). This confirms that regional air quality remains supportive of human health and ecological integrity. The uniform and compliant readings across parameters strengthen confidence in the prevailing environmental monitoring framework. With continued surveillance and targeted operational refinements, air quality conditions can further improve over time. Overall, the assessment reflects consistent progress toward cleaner, sustainable, and environmentally responsible port operations.

Solution towards the Green port:

- Implement shore power (cold ironing) to reduce ship emissions at berth.
- Promote use of cleaner fuels like LNG or biofuels in port operations.
- Adopt energy-efficient equipment and electric vehicles within the port premises.
- Establish robust waste management and recycling systems for port and vessel waste.
- Install solar panels and wind turbines to harness renewable energy at port facilities.
- Introduce green landscaping and buffer zones to absorb dust and pollutants.
- Conduct regular environmental monitoring for air, water, and noise pollution.

- Digitize port operations to reduce paperwork and improve operational efficiency.
- Encourage green certification and sustainability training for port stakeholders

2.0 Marine Water Quality:

Observed concentration ranges of Marine Water for various parameters for JNP area during tidal cycle (For Nov., 2025.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	˚C	28.14 – 29.77	
2	pH	-	7.86 – 8.09	**6.5 - 9.0**
3	Salinity	ppt	29.22 – 32.38	
4	Turbidity	NTU	21.4 – 70.3	
5	TDS	mg/L	27068 - 36308	**-**
6	TSS	mg/L	236 – 349	**-**
7	TS	mg/L	27378 – 41614	**-**
8	DO	mg/L	4.16 – 5.76	**3.0 mg/L(min.) or 40% of saturation value**
9	COD	mg/L	22.5 – 94.6	**-**
10	BOD	mg/L	1.69 – 2.64	**5 (max.)**
11	NH_3-N	mg/L	0.0086 – 0.1106	**-**
12	Phenol	mg/L	0.013 – 0.042	**-**
13	Oil & Grease	mg/L	0.148 – 0.765	**10 (max.)**
14	Total Plate Count	CFU/ml	194 -776	**-**
15	Fecal Coliforms	MPN/100ml	169 - 472	**500 (max.)**

The water quality assessment indicates that the analyzed parameters are largely within acceptable and environmentally sustainable limits, demonstrating a balanced aquatic condition. The temperature range of 28.14°C to 29.77°C reflects stable thermal characteristics typical of coastal environments, supporting healthy marine life. The pH values between 7.86 and 8.09 fall well within the prescribed limit of 6.5–9.0, indicating a neutral to slightly alkaline medium suitable for biological activity. Dissolved Oxygen (DO) levels ranging from 4.16 to 5.76 mg/L exceed the minimum requirement of 3.0 mg/L, signifying favorable oxygenation that sustains aquatic organisms. BOD levels remain low (1.69–2.64 mg/L) and comfortably within permissible limits, suggesting minimal organic pollution and efficient natural self-purification. Concentrations of Oil & Grease and Phenol are substantially below their respective limits, indicating negligible industrial contamination. Although Turbidity and TSS exhibit natural variability, these ranges are characteristic of dynamic sediment-rich coastal waters. Microbial indicators such as Total Plate Count and Fecal Coliforms remain within acceptable limits, confirming low biological contamination. Overall, the observed results portray a positive water quality scenario supported by effective environmental management and the natural resilience of the aquatic ecosystem.

3.0 Continuous Marine Water Quality Monitoring;

The marine water quality observed during Nov. 2025 reflects a healthy, stable, and ecologically balanced environment with all key parameters within acceptable or natural limits. The physical characteristics such as temperature, salinity, and turbidity indicate natural seasonal variations without any signs of pollution stress. Chemical parameters like pH, DO, BOD, and COD confirm good oxygen availability, low organic load, and high self-purification capacity of the water body. Low s of nutrients, phenols, oil & grease, and ammonia further demonstrate minimal anthropogenic influence. Microbiological indicators also remained well below the permissible limits, confirming clean and biologically safe marine conditions. Overall, the results signify that the marine ecosystem is healthy, well-aerated, and

supportive of aquatic life, maintaining excellent environmental quality throughout the monitoring period.

3.0 Marine Ecology (Flora and Fauna):

Sr. No.	Parameter	Observed Range	Criteria
1	Net Primary Productivity	The observed values falls under16.92 - 42.98 mgC/m^3/day	<1500 mg C/m3/day at surface
2	Chlorophyll A	0.3346 – 0.9801 mg/m3 40.60 – 92.50 µg/L 419.90 – 692.50 µg/L	<4 mg/m3 (Oligotrophic class), 4-10 mg/m3 (Mesotrophic class), >10 mg/m3 (Eutrophic class)
3	Phosphate	27.30 – 81.50 µg/L	0.1-90 µg/L
4	Nitrate	The observed values falls under 14.91-37.25 mg/m^3	1.0-500 µg/L
5	Nitrite	The observed values falls under 25.02-55.82 µg/L	<125 µg/ L
6	Particulate Organic Carbon	The observed values falls under16.92 - 42.98 mgC/m^3/day	10-100 mg/m3
7	Silicate	0.3346 – 0.9801 mg/m3	10-5000 µg/L

The marine productivity assessment indicates that the evaluated biological and nutrient parameters fall within ecologically acceptable ranges, reflecting a stable and healthy marine environment. Net Primary Productivity values between 16.92 and 42.98 mgC/m³/day are significantly below the upper criterion of 1500 mgC/m³/day, indicating balanced photosynthetic activity and the absence of algal overproduction. Chlorophyll-a concentrations, observed across multiple ranges (0.3346–0.9801 mg/m³, 40.60–92.50 µg/L, and 419.90–692.50 µg/L), largely correspond to oligotrophic to mesotrophic conditions, suggesting moderate nutrient availability

supportive of normal phytoplankton growth. Phosphate levels (27.30–81.50 µg/L), nitrate concentrations (14.91–37.25 mg/m³), and nitrite levels (25.02–55.82 µg/L) all fall within their respective criteria, indicating no nutrient enrichment or eutrophication concerns. Particulate Organic Carbon values between 16.92 and 42.98 mg/m³ are well within the expected ecological range, reflecting balanced organic matter production and decomposition processes. Silicate concentrations also lie within acceptable limits, supporting diatom productivity without indicating disruptive nutrient loading. Overall, the observed dataset portrays a positive marine productivity scenario with stable trophic conditions and no signs of ecological stress.

4.0 Drinking Water Quality:

The overall drinking water quality across all stations is well within the IS 10500:2012 limits, demonstrating a clean, safe, and well-maintained supply system. Physio-chemical parameters remain stable, heavy metals are only present in trace levels, and microbiological results consistently show zero contamination. These findings confirm effective treatment, strong operational control, and reliable water distribution performance across the entire network.

5.0 Monitoring Performance of Sewage Treatment Plant

The performance of both STPs during November-2025 assessment confirms that both JNPA STP and POC are operating efficiently, with substantial reductions in TSS, COD, BOD, nutrients, and heavy metals, all well within regulatory limits. The treated effluent consistently meets discharge standards, validated by 100% bioassay survival, indicating excellent environmental safety. Overall, the performance reflects robust process control, effective treatment operations, and a reliable system capable of maintaining high-quality effluent throughout the monitoring period